

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-40 Canceled

Claim 41 (New): Method of preparation of a monolithic hydrated alumina, the said method comprising, in succession, the following steps:

- a) abrading of a surface of a part made of aluminium or an aluminium alloy;
- b) covering of the said surface with a mercury amalgam comprising at least one noble metal; and
- c) exposure of the said covered surface obtained at b) to a wet oxidizing atmosphere.

Claim 42 (New): Method of preparation according to Claim 41, which furthermore includes a step of cooling the said surface, the said step being carried out simultaneously with the exposure step c).

Claim 43 (New): Method of preparation according to Claim 42, in which the cooling step is carried out by means of a heat extraction system connected directly to the surface obtained at b).

Claim 44 (New): Method of preparation according to Claim 41, which furthermore includes at least one step of regenerating the surface covered with amalgam, the said regeneration step consisting in removing the amalgam previously deposited and then in redepositing an amalgam, as defined in Claim 41, and in again exposing the newly covered surface to a wet oxidizing atmosphere.

Claim 45 (New): Method of preparation according to Claim 41, wherein the aluminium surface is a surface having an aluminium content of 99.99 to 99.999% by weight.

Claim 46 (New): Method of preparation according to Claim 41, in which the noble metal included in the amalgam is chosen from the group consisting of silver, gold, palladium, platinum, rhodium, iridium, ruthenium and mixtures thereof.

Claim 47 (New): Method of preparation according to Claim 46, in which the noble metal is silver.

Claim 48 (New): Method of preparation according to Claim 47, wherein the mercury amalgam has a silver content ranging from 1 to 43 at% silver.

Claim 49 (New): Method of preparation according to Claim 41, in which the covering step b) is carried out by direct deposition of the amalgam in liquid form on the surface to be covered.

Claim 50 (New): Method of preparation according to Claim 41, in which the covering step is carried out by depositing a mercury salt and at least one noble metal salt directly on the surface, the amalgam forming directly on the said surface.

Claim 51 (New): Method of preparation according to Claim 41, in which the oxidizing atmosphere is air.

Claim 52 (New): Method of preparation according to Claim 41, in which the wet oxidizing atmosphere is such that it has a relative humidity ranging from 20% to 99.99%.

Claim 53 (New): Method of preparation according to Claim 41, in which the exposure step c) is carried out substantially at ambient temperature.

Claim 54 (New): Method of preparation of a monolithic amorphous anhydrous alumina, which includes a step of heating the hydrated alumina prepared by a method according to Claim 41 to an appropriate temperature.

Claim 55 (New): Method of preparation of a monolithic alumina crystallized in the δ , γ , θ , κ , κ' , or α form, which includes a step of heating the hydrated alumina prepared by a method according to Claim 41 to an appropriate temperature.

Claim 56 (New): Method of preparation according to Claim 55, which includes, when the alumina is of the γ or θ type, before the heating step, a step of exposing the hydrated alumina prepared by a method according to Claim 41 to the vapour of at least one oxide precursor at a substantially ambient temperature.

Claim 57 (New): Method of preparation according to Claim 56, in which the, or at least one, oxide precursor is a silica precursor.

Claim 58 (New): Method of preparation according to Claim 57, in which the, or at least one, silica precursor is chosen from the group consisting of tetraethoxysilane and trimethylethoxysilane.

Claim 59 (New): Method of preparation according to Claim 55, which further includes, when the alumina is of the δ , γ , θ , κ , κ' , or α type, before the heating step, a step of exposing the hydrated alumina prepared by a method according to Claim 41 to the vapour of an acid or base at a substantially ambient temperature.

Claim 60 (New): Method of preparation according to Claim 59, in which the acid vapour is hydrochloric acid vapour.

Claim 61 (New): Method of preparation according to Claim 59, in which the base vapour is ammonia vapour.

Claim 62 (New): Method of preparation of a monolithic aluminate, which comprises in succession:

d) a step of impregnating an alumina with at least one compound containing one or more metal elements to be introduced into the said alumina, in order to form the aluminate, the said alumina being produced by a method according to Claim 41; and

e) a step of decomposing the said compound introduced at d) by heating it, followed by a step of forming the aluminate by heating.

Claim 63 (New): Method of preparation according to Claim 62, in which the compound comprising the metal element or elements to be introduced is tetraethoxysilane.

Claim 64 (New): Method of preparation according to Claim 62, in which the compound comprising the metal element or elements to be introduced is a metal salt chosen from the group consisting of magnesium, titanium, iron, cobalt, copper, nickel, yttrium, actinide and lanthanide nitrates or chlorides, and mixtures thereof.

Claim 65 (New): Method of preparation according to Claim 62, in which the step of decomposing the compound chosen is carried out in air by heating to a temperature substantially equal to 500°C.

Claim 66 (New): Method of preparation according to Claim 62, in which the step of forming the aluminate is carried out in air by heating to a temperature ranging from 700 to 1400°C.

Claim 67 (New): Method of preparation of a composite material comprising an alumina and/or an aluminate and at least one other compound and/or element, the said alumina being obtained by a method comprising, in succession, the following steps:

- a) abrading of a surface of a part made of aluminium or an aluminium alloy;
- b) covering of the said surface with a mercury amalgam comprising at least one noble metal; and
- c) exposure of the said covered surface obtained at b) to a wet oxidizing atmosphere

and the said aluminate being obtained by a method which comprises in succession:

- d) a step of impregnating an alumina with at least one compound containing one or more metal elements to be introduced into the said alumina, in order to form the aluminate, the said alumina being produced as above; and
- e) a step of decomposing the said compound introduced at d) by heating it, followed by a step of forming the aluminate by heating,

the said method comprising in succession, the following steps:

- f) a step of impregnating the alumina and/or the aluminate with at least one precursor of the said other compound(s) and/or element(s); and
- g) a step of forming the said compound(s) and/or element(s), the compound(s) and/or element(s) forming with the alumina and/or the aluminate, after this step, the composite material.

Claim 68 (New): Method of preparation according to Claim 67, in which the other compound is chosen from a group consisting of ceramics, metals, polymers and mixtures thereof.

Claim 69 (New): Method of preparation according to Claim 67, in which the element is elemental carbon.

Claim 70 (New): Method of preparation according to Claim 69, in which the elemental carbon is chosen from the group consisting of graphite, pyrolytic carbon, glassy carbon and mixtures thereof.

Claim 71 (New): Method of preparation according to Claim 68, in which, when the other compound is a ceramic, the precursor of this compound is a metal salt chosen from the

group consisting of sodium metatungstate, ammonium metatungstate, zirconium oxychloride, calcium, yttrium, actinide, lanthanide, magnesium, copper, iron, cobalt and nickel nitrates, diammonium titanyl oxalate, titanium and barium chlorides, and mixtures thereof.

Claim 72 (New): Method of preparation according to Claim 68, in which the step for forming the ceramic is produced, in air, by heating the said precursors to a temperature of between 400°C and 800°C.

Claim 73 (New): Method of preparation according to Claim 68, in which, when the other compound is a metal, the precursor of this compound is a metal salt chosen from the group consisting of iron, cobalt, copper, nickel, lead, tin, zinc, tungsten and molybdenum nitrates, sodium metatungstate, ammonium metatungstate, salts of noble metals (silver, gold, palladium, platinum, rhodium, iridium, ruthenium), and mixtures thereof.

Claim 74 (New): Method of preparation according to Claim 73, in which the step for forming the metal comprises a step of decomposing the metal salt or salts, which is carried out in air at a temperature substantially equal to 500°C or at a temperature of 800 to 1200°C, by means of which a metal oxide is obtained after this step, followed by a reduction step, by heating the said metal oxide in order to obtain the metal.

Claim 75 (New): Method of preparation according to Claim 74, in which the reduction step is carried out by the action of a reducing agent chosen from the group consisting of hydrogen and carbon monoxide at a suitable temperature.

Claim 76 (New): Method of preparation according to Claim 68, in which, when the other compound is a polymer, the precursor of this compound is a monomer or a monomer mixture.

Claim 77 (New): Method of preparation according to Claim 76, in which the monomer is chosen from the group consisting of styrene, aniline, isoprene, ethylene, vinyl chloride, butadiene and mixtures thereof.

Claim 78 (New): Method of preparation according to Claim 76, in which the step for forming the polymer consists of a polymerization step.

Claim 79 (New): Method of preparation according to Claim 69, in which, when the element is elemental carbon, the precursor of this element is a hydrocarbon.

Claim 80 (New): Method of preparation according to Claim 79, in which the step for forming the elemental carbon consists of a thermal cracking step.

Claim 81 (New): Method of preparation of a monolithic aluminate, which comprises in succession:

- d) a step of impregnating an alumina with at least one compound containing one or more metal elements to be introduced into the said alumina, in order to form the aluminate, the said alumina being produced by a method according to Claim 54; and
- e) a step of decomposing the said compound introduced at d) by heating it, followed by a step of forming the aluminate by heating.

Claim 82 (New): Method of preparation of a monolithic aluminate, which comprises

in succession:

- d) a step of impregnating an alumina with at least one compound containing one or more metal elements to be introduced into the said alumina, in order to form the aluminate, the said alumina being produced by a method according to Claim 55 ; and
- e) a step of decomposing the said compound introduced at d) by heating it, followed by a step of forming the aluminate by heating.

Claim 83 (New): Method of preparation according to claim 67, wherein the alumina is obtained by a method which includes a step of heating the hydrated alumina to an appropriate temperature.

Claim 84 (New): Method of preparation according to claim 67 wherein the alumina prepared is crystallized in the δ , γ , θ , κ , κ' , or α form, and wherein the alumina is obtained by a method which includes a step of heating the hydrated alumina to an appropriate temperature.

Claim 85 (New): Method of preparation according to Claim 71, in which the step for forming the ceramic is produced, in air, by heating the said precursors to a temperature of between 400°C and 800°C.

Claim 86 (New): Method of preparation according to Claim 77, in which the step for forming the polymer consists of a polymerization step.

Claim 87 (New): Method of preparation according to Claim 70, in which, when the element is elemental carbon, the precursor of this element is a hydrocarbon.

Claim 88 (New): Method of preparation according to Claim 47 wherein the mercury amalgam has a silver content substantially equal to 40 at% silver.

Claim 89 (New): Method of preparation according to Claim 74, in which the reduction step is carried out by the action of a reducing agent chosen from the group consisting of hydrogen and carbon monoxide at a temperature ranging from 500 to 1200°C.